

CLAIMS

We claim:

1. A system for processing semiconductor wafers comprising:
 - a first inlet for a first supply of drying fluid;
 - a second inlet for a second supply of drying fluid, a rate of supply of the second supply of drying fluid being independent of that of the first supply of drying fluid;
 - a decontaminating fluid tank for storing a supply of decontaminating fluid, the decontaminating fluid tank having an inlet for receiving the second supply of drying fluid, and having an outlet for supplying decontaminating fluid at a rate that is based on the rate of supply of the second supply of drying fluid; and
 - a process chamber for housing the semiconductor wafers to be cleaned and dried, the process chamber having an inlet for simultaneously receiving the first supply of drying fluid and the supply of decontaminating fluid.
2. The system of claim 1 wherein the first supply of drying fluid comprises nitrogen gas.
3. The system of claim 1 further comprising a first heater for heating the first supply of drying fluid between the first inlet and the process chamber.
4. The system of claim 1 wherein the second supply of drying fluid comprises nitrogen gas.
5. The system of claim 1 further comprising a second heater for heating the second supply of drying fluid between the second inlet and the decontaminating fluid tank.
6. The system of claim 1 further comprising a third heater coupled to the decontaminating fluid tank for heating the decontaminating fluid in the tank.

7. The system of claim 6 wherein the decontaminating fluid in the tank is partially heated by the third heater from a liquid into a vapor and wherein the second supply of drying fluid drives the decontaminating fluid vapor through the outlet of the decontaminating fluid tank.
8. The system of claim 7 wherein the inlet of the decontaminating fluid tank includes a first inlet for receiving the second supply of drying fluid at a level below the level of the liquid and a second inlet for receiving the second supply of drying fluid at a level above the level of the liquid.
9. The system of claim 1 further comprising a fourth heater coupled to a line in turn coupled to the inlet of the process chamber for heating the first supply of drying fluid and the supply of decontaminating fluid prior to their release into the process chamber.
10. The system of claim 1 wherein the first supply of drying fluid and the supply of decontaminating fluid received at the process chamber are in a vapor state.
11. The system of claim 1 further comprising a coupling tube for selectively coupling the first supply of drying fluid to the decontaminating fluid tank.
12. The system of claim 1 further comprising a coupling tube for selectively coupling the second supply of drying fluid directly to the process chamber.
13. The system of claim 1 further comprising a coupling tube for selectively coupling the first inlet to the second inlet.
14. The system of claim 1 wherein the process chamber further comprises a drain.

15. The system of claim 14 further comprising a buffer tank coupled to the drain of the process chamber.
16. The system of claim 15 wherein the drain comprises a plurality of drains, and wherein the plurality of drains are coupled to the buffer tank.
17. The system of claim 16 wherein the plurality of drains are of a width to ensure rapid draining of the process chamber.
18. The system of claim 16 wherein the plurality of drains are spaced apart in the process chamber to ensure that a top surface of a fluid to be drained from the process chamber remains level as the process chamber is drained.
19. The system of claim 16 wherein the plurality of drains are of a width to ensure rapid draining of the process chamber within a time period less than about 50 seconds.
20. The system of claim 16 wherein the plurality of drains are of a width to ensure rapid draining of the process chamber within a time period ranging between about 7 and 17 seconds.
21. The system of claim 15 wherein the buffer tank is of a volume that is greater than or equal to a volume of the process chamber.
22. The system of claim 1 further comprising a first supply rate controller for controlling the rate of supply of the first drying fluid and a second supply rate controller for controlling the rate of supply of the second drying fluid, the first and second supply rate controllers being independent of each other such that the rate of supply of the first drying fluid and the rate

of supply of the second drying fluid are independent relative to each other.

23. The system of claim 1 wherein the process chamber further comprises a plurality of exhaust ports distributed in the process chamber to provide for laminar flow of the decontaminating fluid and the drying fluid in the process chamber.
24. A system for processing semiconductor wafers comprising:
 - a first inlet for a first supply of drying fluid ;
 - a second inlet for a second supply of drying fluid, a rate of supply of the second supply of drying fluid being independent of that of the first supply of drying fluid;
 - a decontaminating fluid inlet for receiving a supply of decontaminating fluid; and
 - a process chamber for housing the semiconductor wafers to be cleaned and dried, the process chamber having inlets for simultaneously receiving the first and second supply of drying fluid and the supply of decontaminating fluid.
25. A system for processing semiconductor wafers comprising:
 - a first inlet for a first supply of drying fluid ;
 - a second inlet for a second supply of drying fluid, a rate of supply of the second supply of drying fluid being independent of that of the first supply of drying fluid;
 - a decontaminating fluid inlet for receiving a supply of decontaminating fluid; and
 - a process chamber for housing the semiconductor wafers to be cleaned and dried, the process chamber having inlets for simultaneously receiving the first and second supply of drying fluid and the supply of decontaminating fluid, wherein an additional flow line having a valve is attached between the first inlet and the second inlet.

26. A method for processing semiconductor wafers comprising:
 - providing a first supply of drying fluid;
 - providing a second supply of drying fluid, a rate of supply of the second supply of drying fluid being independent of that of the first supply of drying fluid;
 - storing a supply of decontaminating fluid in a decontaminating fluid tank , the decontaminating fluid tank having an inlet for receiving the second supply of drying fluid, and having an outlet for supplying decontaminating fluid at a rate that is based on the rate of supply of the second supply of drying fluid; and
 - simultaneously supplying the first supply of drying fluid and the supply of decontaminating fluid to a process chamber to decontaminate semiconductor wafers contained therein.
27. The method of claim 26 wherein the first supply of drying fluid comprises nitrogen gas.
28. The method of claim 26 further comprising heating the first supply of drying fluid prior to release in the process chamber.
29. The method of claim 26 wherein the second supply of drying fluid comprises nitrogen gas.
30. The method of claim 26 further comprising heating the second supply of drying fluid prior to release in the decontaminating fluid tank.
31. The method of claim 26 further comprising heating at least a portion of the decontaminating fluid in the tank from a liquid state into a vapor state.
32. The method of claim 26 further comprising heating the first supply of drying fluid and the supply of decontaminating fluid prior to their release into the process chamber.

33. The method of claim 26 wherein the first supply of drying fluid and the supply of decontaminating fluid received at the process chamber are in a vapor state
34. The method of claim 26 further comprising, prior to simultaneously supplying the first supply of drying fluid and the supply of decontaminating fluid to the process chamber:
 - supplying rinsing fluid into the process chamber containing the semiconductor wafers for rinsing the semiconductor wafers;
 - rapidly draining the rinsing fluid from the process chamber;
35. The method of claim 34 further comprising rapidly draining the rinsing fluid into a buffer tank having a volume that is greater than or equal to the volume of the process chamber.
36. The method of claim 34 wherein the rinsing fluid comprises deionized water in a liquid state.
37. The method of claim 34 wherein the rinsing fluid is completely drained prior to simultaneously supplying the first supply of drying fluid and the supply of decontaminating fluid to the process chamber.
38. The method of claim 26 further comprising, following simultaneously supplying the first supply of drying fluid and the supply of decontaminating fluid to the process chamber, supplying a drying fluid into the chamber for drying the semiconductor wafers.